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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/649,827	08/29/2000	Edward A. Schrock	303.527US2	8668

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EXAMINER
KNABLE, GEOFFREY L

ART UNIT	PAPER NUMBER
1733	21

DATE MAILED: 07/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/649,827	SCHROCK ET AL.
	Examiner	Art Unit
	Geoffrey L. Knable	1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *36-42,44-47,49-60 and 62-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *37 and 51-57* is/are allowed.

6)☒ Claim(s) *36,38-42,44-47,49,50,58-60 and 62-65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 39-42, 44-47, 49, 50, 64 and 65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 39 and 44 were amended to define that the hybrid adhesive of the first adhesive layer has both thermoplastic and thermosetting *components.* The hybrid adhesive of the second adhesive layer however is still defined in these claims simply as a "hybrid material of thermoplastic and thermosetting adhesive", i.e. there is no reference to these being *components* of the hybrid material. This is thus subject to all the same ambiguities and enablement issues as noted in the last office action with respect to the hybrid material. For brevity of the office action, these other rejections will however not be repeated here as it is assumed that the intent was that both adhesive layers be defined in the same way and thus the claims have been read in this manner for purposes of this office action. It is however suggested that the definition of the hybrid material of the second layer be made consistent with the above noted amended definition for the first layer - otherwise, it is not clear what is meant by hybrid in this context. If this is not applicant's intent, applicant is hereby notified that all the rejections with respect to the hybrid material that were set forth in the last office action will reemerge, the inclusion of which will not preclude making the next office action final (i.e. applicant should address the previous rejections of this language if no amendment is made or intended with respect to the second adhesive layer).

3. In light of the newly discovered reference to Sawamura et al., the following rejections are applicable to the hybrid adhesive claims.

4. Claims 36, 38-42, 44-47, 49, 50, 58-60 and 62-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fogal et al. (US 5,140,404 - newly applied; already of record) taken in view of Sawamura et al. (US 6,303,219 - newly cited) and optionally the admitted state of the prior art.

Attaching semiconductor dies to substrates using double-sided adhesive carried on a polyimide film is known and conventional in this art - Fogal et al. is exemplary (e.g. note col. 5, lines 3-48; col. 2, lines 1-5; and col. 3, lines 10-21). This reference however would have indicated that thermosetting and thermoplastic resins are each known and suitable but does not suggest a hybrid adhesive as claimed.

Sawamura et al. is also directed to adhesively attaching semiconductors to substrates and in particular teaches using a carrier or tape (e.g. polyimide) that includes an adhesive thereon having a thermosetting component and a thermoplastic component (e.g. col. 7, lines 50+; col. 13, lines 29+; col. 17, lines 12+), this being taught to provide numerous advantages in adhesive strength, reliability, processing, etc. (e.g. cols. 3-4 as well as the last 8 lines of the abstract). To utilize such an adhesive for the adhesive for the conventional double sided tape to adhere a semiconductor would therefore have been obvious in light of the expected advantages suggested by Sawamura et al. It is noted that Sawamura et al. describes various attachment embodiments but only explicitly describes tapes in which the adhesive is coated on one side. The reference however is clearly not limited to any particular bonding method (e.g. col. 11, lines 20-28)

and even indicates that apparently one or both sides of the carrier film can be operated on "as required" (e.g. col.15, lines 46-51). Further, Fogal et al. provides clear evidence of an understanding in this art that both one sided and double sided tapes are suitable and effective for the desired bonding (compare figs. 4 and 5), the choice being well within the skill of the artisan and in any event, it would have been apparent that an adhesive suitable for one-sided bonding would have been expected to be suitable for a double sided methodology.

The admitted state of the prior art (particularly the "Technical Field" and "Background of the Invention" section of the specification) provides further evidence of the known bonding of semiconductors to substrates, this including *organic* substrates and further includes using tapes. Bonding to organic substrates is considered to include the well known and conventional circuit boards, etc. and thus is implicit or in any event certainly obvious particularly in light of the admitted prior art.

The remainder of the claims either define specifics of the additional processing (e.g. wire bonding, encapsulating, etc.) or specifics of the material thicknesses or temperatures. As to the additional processing steps, these are extremely well known, and in most cases necessary steps in most semiconductor attachment processing, the cited references as well as the admitted state of the prior art further clearly indicating such to be well known, conventional and obvious additional processing. As to the material thickness, and temperatures, it is first considered that suitable and effective thicknesses and processing conditions would have been readily and routinely determined by the ordinary artisan dictated by the particular materials/adhesives and

processing used. Note also that Sawamura suggests thickness and temperature ranges consistent with/encompassing those claimed (e.g. col. 7, lines 45-49; col. 19, lines 36-37; col. 7, lines 10-13), it being obvious to select any appropriate value within the ranges suggested. As to new claims 64 and 65, although Sawamura et al. clearly suggests including thermoplastic and thermosetting components and even describes very specific examples, these are not characterized in terms of their Tg. The reference does however indicate a desire to have a "low temperature short time thermal cure" (col. 3, lines 15-16). Further, the portion of the present specification/description underlying these claims, indicates that

> "[t]he thermoset component of the tape is a material having a low thermal processing requirement. That is, the glass transition temperature (Tg) of the thermoset component is low, allowing the tape to laminate at low or ambient temperature."

In other words, it would seem that the low Tg for the thermoset is being used as a proxy for a low lamination/cure processing temperature, it being again noted that Sawamura clearly desires a low temperature thermal cure. Selection of a lower Tg thermoset component is thus considered to either implicit or obvious from the reference disclosure of a desire to have a low temperature cure (it being apparent that it clearly is only the thermoset component that is being discussed since the thermoplastic component does not cure).

5. Claims 37 and 51-57 are allowed as noted in the last office action.

It is noted that previously claims 58-60, 62 and 63 were included within the listing of allowed claims. This however was in error as these claims did not depend from the

allowed claims that are directed to the polyimide film coated on both sides with a CTBN/epoxy material for use in a semiconductor attachment or bonding environment.

6. Applicant's arguments have been considered and are convincing with respect to the previous rejections under 35 USC 112 but are otherwise moot in view of the new ground(s) of rejection.

It is noted for the record that with the amendment to the claims defining that the hybrid adhesive is a material having thermoplastic and thermosetting *components*, it is considered that the ordinary artisan would have been enabled to practice the invention consistent with these claims, it being also noted that references such as the newly cited Sawamura et al. reference further evidence it to be known to combine thermoplastic and thermosetting components in an adhesive material.

It is also noted that several independent and dependent claims describe material thicknesses for the hybrid adhesive embodiment whereas the detailed description of this embodiment does not provide explicit support thereof as the thickness is only described for one adhesive embodiment. However, although the claimed thicknesses were only originally described in the paragraph/context of the CTBN modified epoxy embodiment, it is considered that read as a whole, the artisan would have understood this as supporting/describing thicknesses for the adhesive in general, i.e. any of the described adhesive embodiments and thus no lack of description/new matter rejection was made.

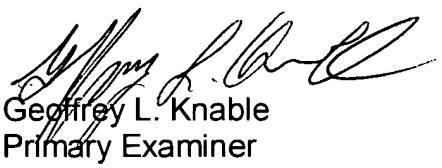
Applicant is advised that consistent with the new amendment format, the full text of *canceled* claims should not be included.

This action has not been made final as although the new amendments further describing the hybrid adhesive did provide a clearer indication of the claim scope, the new ground of rejection was not technically necessitated by amendment.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey L. Knable whose telephone number is 703-308-2062. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on 703-308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Geoffrey L. Knable
Primary Examiner
Art Unit 1733

G. Knable
June 27, 2003